Are current cities dense enough?

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Details

Chair: Seán O'callaghan

Speaker

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Are current cities dense enough?

Author(s) - Presenters are indicated with (p)

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Abstract

One of the main predictions of urban economic theory is that the density of land use reacts to the price of land. For many activities, substitution between land and built-up structure is possible when land is scarce, often by constructing more square meters of floor space on a given amount of land. In recent decades, interest in living and working in (big) cities has increased markedly and urban land prices have increased substantially. Since it appears unlikely that the cost of construction of square meters of floor space has increased much or more than land prices, one expects that optimal land use is now denser than it was in the past. This seems to be confirmed by recent observations of densification in Dutch urban areas. Density of urban areas has implications for traffic, energy use, the total size of the urban area and agglomeration

benefits in consumption and production. The sluggish response to higher land prices that is associated with durable real estate and significant adjustment costs probably implies that actual cities are less dense than would be optimal.

For this research a spatial model is developed that offers the possibility to systematically investigate the issue of densification. It compares the density of current and alternative uses in the Netherlands. Alternative uses are calculated using for this research constructed hedonic price indices (based on roughly 70% of all house transactions in the Netherlands), construction costs and demolition costs. Analysis of past changes in land use, using information of the relevant prices and construction costs offers the possibility to consider the conditions under which a switch to higher density takes place as well as the 'jump' in density that may occur. This offers insight into the speed with which the adjustment to higher density takes place. Moreover, the results provide an important ingredient for a general equilibrium analysis of the way the city would look like if adjustment would be complete. In this analysis it is taken into account that in the rebuilt city more households can live and more workers can be employed in a square kilometre, which implies that with the same population and employment size the city can be smaller. This implies that prices of existing real estate at the current edge of the city will adjust in the absence of population growth, thereby counteracting further densification.

Dr. Paul Kilgarriff
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Consumption Value of Housing: A Spatial Perspective

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Abstract

The measure of a household's wealth should include not only monetary components but also non-monetary components and in-kind benefits such as imputed rent. In this paper the impact of net imputed rent on the distribution of income is examined in a spatial context. Two aspects of housing make it interesting; namely its costs and benefits. Housing wealth can provide a stream of consumption value. This will come in the form of imputed rent. Imputed rent is the rent an owner can expect to receive were the house on the rental market. We examine the spatial impact of net imputed rent, mortgage payments, private rent, public rent (social housing schemes) and annuity values on the distribution of disposable income from SMILE for the year 2011. 2011 is examined as it is the latest Census year for which detailed spatial micro data is available. We measure rental values at a detailed spatial scale (Electoral Division) adopting the kriging methodology (Brunsdon and Comber, 2015). To measure mortgage values, missing data analysis is employed to match various data sources (Enders, 2010). The created data is merged into the SMILE population dataset to examine the impact of housing on the spatial distribution of disposable income at a small area level. Our results show that housing decreases the income share of those at the top and bottom of the income distribution. The income of the elderly is also greatly increased.

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A Dynamic simulation model to support the strategic analysis of raw milk transportation

Author(s) - Presenters are indicated with (p)

Seán O'Callaghan (p), Declan O'Connor

Abstract

The primary purpose of this paper is to present a novel approach to the vehicle routing problem (VRP) which has been utilized to form the starting point for a simulation model that can be used for the strategic analysis of the milk transportation industry in Ireland. Additionally, the proposed simulation allows for the creation of realistic dynamic load building and routing schedules for rural raw milk collection. Moreover, a further aim of the research, is to identify and in turn cater for the unique and complex characteristics involved in the raw milk collection environment that currently faces the modern day Irish dairy sector. One of the key goals of all physically distributed collection systems is the optimisations of either delivery or, as in this case, the collection of goods i.e. raw milk from sporadically situated locations. The purposed paradigm considers the geographic routing needs of a custom-built fleet of milk collection road tankers. These tankers are designed to have multiple chambers. Furthermore, as raw milk is a perishable product it is crucial that the purposed simulation design takes in to account elements such as the on farm pumping time and the limited transportation time window available to deliver the collected fresh milk to the processing plant in pristine condition. The simulation model has been designed to take into account a combination of the optimisation of distance, load capacity and time taken to complete each collection route, but also to consider other elements such as a rural network of roads, asynchronous journey routes between various producers, dynamically changing volumes, seasonally adjusted patterns of milk production and issues such as carbon dioxide emissions. With major issues facing the Irish dairy industry such as Brexit and major environmental issues, simulation models such as that presented in this research paper are essential tools required by those involved in the Irish milk transportation industry ranging from route and load scheduling practitioners to policy makers within the sector